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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,955	02/26/2002	Jason Barnabas Langhorn	CTS-2287	5009

29184 7590 11/28/2003

CTS CORPORATION
905 W. BLVD. N
ELKHART, IN 46502

EXAMINER

GEBREMARIAM, SAMUEL A

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/082,955

Applicant(s)

LANGHORN, JASON BARNABAS

Examin r

Samuel A Gebremariam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 9-15 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinds EP, 1057779A2 in view of Karpman U.S. patent No. 6,441,481.

Regarding claim 1, Hinds teaches (figs. 1, 2 and 3) a semiconductor package for a micro-machined semiconductor device (40), comprising: a) a substrate (22 and 30) having a first surface (24) and a second surface (23), the micro-machined semiconductor (40) device located adjacent the first surface (24); b) a plurality of vias (25 and 33), extending through the substrate between the first and second surfaces; c) an electrical connection (34) located between the vias and the micro-machined semiconductor device for electrically connecting the vias to the semiconductor device; d) a solder seal, located between the micromachined semiconductor device (40) and the first surface (24) for hermetically sealing the micro-machined semiconductor device f) a plurality of solder spheres (18) mounted to the second surface (23) and electrically connected to the vias (25).

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Hinds does not explicitly teach a rigid support located between the micro-machined semiconductor device and the first surface for supporting the micro-machined semiconductor device during assembly.

However Hinds shows in figures 2 and 3 a structure preventing the micro-machined semiconductor device from contacting the first surface (24). Furthermore the use of spacer structures is conventional in the art and also taught by Karpman (fig. 5) for protecting a microstructure (12) using structures (20 and 22 (rigid structure)) (col. 4, lines 38-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the rigid structure taught by Karpman in the structure of Hinds in order to protect the micro-machined semiconductor device.

Regarding claim 2, Hinds teaches (fig. 3) substantially the entire claimed structure of claim 1 above including a first pad (44) located on the micro-machined semiconductor device; and a second pad (32) located on the first surface and a solder joint (50) between the first and second pad.

Regarding claim 3, Hinds teaches substantially the entire claimed structure of claim 1 above including the substrate is ceramic (col. 3, lines 26-32).

Regarding claim 4, Hinds teaches substantially the entire claimed structure of claim 1 above including the seal is a ring of solder located adjacent an outer perimeter of the substrate (figs 2 and 3, col. 4, lines 12-27, Hinds).

Regarding claim 5, Hinds teaches the entire claimed structure of claim 1 above including the rigid support is attached to the first surface.

Since the combined structure of Hinds and Karpman is the same as the claimed invention, the rigid support is inherently attached to the first surface.

Regarding claim 9, Hinds teaches substantially the entire claimed structure of claim 1 above including the substrate has a plurality of layers (fig. 2, Hinds).

Regarding claim 10, Hinds teaches the entire claimed structure of claim 1 above including a plurality of circuit lines (26) located on the layers, the circuit lines connected between vias (20 and 25).

Regarding claim 11, Hinds teaches the entire claimed structure of claim 1 above including a ball pad (17) is attached to the second surface (15), the solder sphere (18) attached to the ball pad.

Regarding claim 12, Hinds teaches substantially the entire claimed structure of claim 1 above including the solder sphere is attached to the ball pad by a reflowed solder paste (col. 3, lines 45-47, Hinds).

Regarding claims 13-15, and 19-21, Hinds teaches substantially the entire claimed structure of claims 1, 3 and 9 above including the micro-machined semiconductor device is spaced from the top surface by the rigid supports such that a movable portion of the micro-machined semiconductor device is unconstrained for movement (col. 6, lines 45-52); and an electrical connection (34) located between the vias (33) and the micro-machined semiconductor device for electrically connecting the vias to the semiconductor device.

Claims 6-8 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinds, Karpman in view of Pasch US patent No. 5,700,715.

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Regarding claims 5, 6, 16 and 17, Hinds teaches substantially the entire claimed structure of claims 1, 5 and 13 above except explicitly stating that the rigid support is made of gold, or alloy of gold and palladium.

Pasch teaches (fig. 2a) forming pillar structures (240) that is either conducting or insulating for use as support structure in the event the solder bumps collapse.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the conductive pillar structure taught by Pasch in the structure of Hinds in order to form support structure.

Since gold, alloy of gold and palladium are conductors, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experiment with the claimed materials in the structure of Hinds in order to form a better support structure.

Regarding claims 8 and 18, Hinds teaches substantially the entire claimed structure of claims 1 and 16 above except explicitly stating that the rigid support is ultrasonically deposited.

The limitation that the rigid support is ultrasonically deposited is considered to be a product-by-process claim. "[E]ven though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a

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different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Response to Arguments

3. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference B is cited as being related to MEMS.

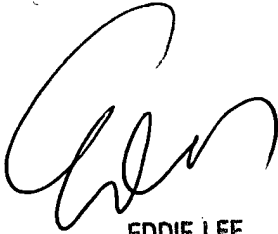
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Admassu Gebremariam whose telephone number is 703 305 1913. The examiner can normally be reached on 8:00am-4: 30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 305-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Samuel Admassu Gebremariam
November 21, 2003



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

